

NOVEMBER/DECEMBER 2024

**23UMB31 — MOLECULAR BIOLOGY AND
MICROBIAL GENETICS**

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Name the different forms of DNA and mention one characteristic of each.
2. Define the linking number in DNA topology.
3. Categorize the types of RNA polymerases in prokaryotes and eukaryotes.
4. List out the main features of tRNA structure.
5. Define frame shift mutations.
6. Define silent mutations.
7. List out the function of F plasmids.
8. Distinguish between the lytic and lysogenic cycles of Lambda phage.
9. What is generalized transduction?
10. Define transposition.



SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Explain the salient features of the DNA double helix.

Or

- (b) Explain the DNA organization in prokaryotes.

12. (a) Discuss the structure and function of ribosomes in eukaryotes.

Or

- (b) Evaluate the role of DNA methylation in gene expression regulation.

13. (a) Infer the uses of mutations in scientific research and medicine.

Or

- (b) List out the effects of physical and chemical mutagens on DNA.

14. (a) Explain the mechanisms involved in the regulation of plasmid copy number.

Or

- (b) List out the applications of phages in microbial genetics.

15. (a) Explain the mechanism of bacterial conjugation.

Or

- (b) Dissect the structure and function of insertion sequences and composite transposons.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain in detail about the mechanism of DNA replication, including the roles of various enzymes involved.

17. Describe in detail the transcription process in prokaryotes.

18. Summarize the different DNA repair mechanisms in detail.

19. Discuss in detail about the different types of plasmids.

20. Discuss the process of transformation in bacteria and its applications in genetic engineering.

